

three years ago, Dr. Keller advanced his views on the origin of domesticated animals. The present little work is an abstract of the larger one, and gives only the most meagre outline of the evidence on this difficult subject. The time has not yet arrived when such a work can be successfully written. We know far too little to establish conclusions on the origin of most of our familiar animals, and we can only recommend this work on a most interesting subject with considerable reserve. Prof. Ewart's work on horses appears to be unknown to the author. The book has no index.

(5) The general scheme of this primer is excellently devised. Beginning with a sketch of function, the author passes on to differentiation. The values, transformations, and elaboration of food-stuffs are next dealt with, and a special section is given to "sensitivity." The adaptations of organisms are briefly considered, and a short account of reproduction is given. The primer concludes with a sketch of the theory of natural selection. Such a concise statement of the general principles of animal and plant life should be of considerable use to teachers of elementary science.

The value of the book would have been increased by better illustrations. Many of those employed (for example, Nos. 8, 9, 18, 19, 37, 40, and 47) are so incompletely described as to lose much of their value. The figure of *Padina* (Fig. 2) is extremely vague. The text as a whole is what we should expect from such an experienced teacher as Prof. Harvey Gibson, and it has had the benefit of revision from his colleagues. The account of the destruction of life as illustrated by a dinner (p. 114) is perhaps open to criticism. The benefits of cultivation in increasing the number and variety of edible organisms are not pointed out. Moreover, in contrast to wild species, the individuals of cultivated ones have surely not remained "fairly constant" in numbers. Demand has in this case created supply. So far from illustrating natural selection, such an example seems to typify artificial selection. The statement about green *Hydra* on p. 43 goes beyond our present knowledge.

SOME NEW ELECTRICAL BOOKS.

- (1) *The Bell Telephone*. The Deposition of A. G. Bell in the Suit brought by the United States to annul the Bell Patents. Pp. iv+469. (Boston : The American Bell Telephone Co., 1908.)
- (2) *How Telegraphs and Telephones Work*. Explained in non-technical language by C. R. Gibson. Pp. vi+156. (London : Seeley and Co., Ltd., 1909.) Price 1s. 6d. net.
- (3) *Technical Electricity*. By H. T. Davidge and R. W. Hutchinson. Second edition. Pp. xi+539. (Cambridge : University Tutorial Press, Ltd., 1909.) Price 4s. 6d.
- (1) **T**HE printing of the full deposition made by Mr. Bell in the suit brought by the United States to annul the Bell telephone patents doubtless furnishes a valuable historical record of the experiments which led to the invention of the telephone, and, since the deposition was never officially printed,

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the American Bell Telephone Co. has performed a useful service in the publication of this book. To any who may still be interested in the legal aspects of the case the book should also prove valuable. But for the general reader, even when specially interested in telephony, the verbatim report of a legal examination and cross-examination is a very unsatisfactory medium for conveying information. The constant repetitions, the frequent insistence on what must be regarded from the broader point of view as wholly irrelevant details, and, above all, the clumsiness of a dialogue devoid of literary merit, make very poor reading, and one is liable to be overcome with ennui before any salient points have been gleaned.

By judicious, if comprehensive, skipping, however, many facts of both scientific and general interest may be obtained from this volume, and to many the detailed descriptions of the earlier struggles and difficulties leading to an invention of enormous utility and importance will have a particular fascination. It is only to be regretted that the book was not written in consecutive narrative form, though possibly some of its value as a record might have been sacrificed thereby.

(2) That Mr. Gibson has an aptitude for the description in non-technical language of the achievements of modern technology has been amply proved by his earlier books which have been reviewed in these columns. The present small volume shares the merits of its predecessors. The very large degree to which the telegraph and telephone enter into the daily life of the community should make this book particularly useful, and it should find a large circle of readers. The book is more or less an amplification of the chapters dealing with this branch in earlier more general books. The subjects covered are telegraphy and telephony, both with wires and without; there is a short chapter on lightning, the reason for the inclusion of which "by request" does not seem clear, and three concluding chapters of a more general character on electrical units and theory. The volume is well printed and illustrated.

(3) This text-book was originally published in 1906, and the present is the third impression. Advantage has been taken of the new edition to bring some parts of the book more up to date, but the revision has not been very thorough, as reference to the chapter on lamps (in which there has been very marked progress since 1906) will show. The tungsten lamp is allotted seven lines of small print, but the osmium lamp, almost if not quite defunct, remains in possession of what we presume was its original position in the main text. The whole chapter on lamps seems to us poor; the drawing of an arc in Fig. 128 is purely imaginary, and the authors would do well to refer to Mrs. Ayrton's book before they issue their next edition; the section on flame arcs and the reference to the Bremer arc lamp lead us to the conclusion that the authors have no correct idea of the real difference between the flame and the ordinary arc.

It is perhaps somewhat unkind to take exception to such errors in what is only one chapter amongst four-and-twenty. But it is deplorable that a text-

book should give incorrect or misleading information; the authors' aim "at spanning the gulf which too often divides pure theory and practical engineering" will not be realised if the student is obliged to unlearn much that they teach him when he becomes a practical engineer. We do not profess to be experts in the whole subject of electrical engineering, and cannot criticise the whole book, therefore, on the same lines as we have criticised the section on lamps; but the authors, by writing such a book, lay claim—at least so far as fundamentals are concerned—to be such experts, and if we find them at fault at one part we are led to suspect the whole.

The book covers the whole electrical field; the arrangement is that usually adopted, opening with electrostatics and magnetism, and passing on to electric currents. The diagrams and illustrations are for the most part good, but the process blocks (fortunately few) come out badly on the class of paper used. There are numerous exercises for the student to work out at the end of each chapter.

M. S.

OUR BOOK SHELF.

Gas-engine Theory and Design. By A. C. Mehrrens. Pp. v+256. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1909.) Price 10s. 6d. net.

THE writer of this book is an instructor in mechanical engineering in the Michigan Agricultural College. His aim, he tells us, has been to prepare a book for all who are interested in gas engines, whether students, draughtsmen, engineers, or engine operators.

This is an ambitious aim, and we may well doubt the possibility of its being carried out in such a small compass; but there can be no doubt that the cardinal virtues of simplicity and conciseness of language which any such intention must require are here presented in no usual degree. The reviewer does not remember any book hitherto written on the gas engine which presents its subject with such lucidity.

The chief entry to be made on the debit side of the account is that the extent of the field covered is far too great. It will be found, on perusing the volume, that it not only deals with the history and present position of gas-engine invention, and with the properties of the gases and fuels used, but also with such a big subject as the design of engine details and the dimensions of parts. Students usually learn their physics and machine design independently of the steam or gas engine, and a book on the gas engine which includes a great deal of what has already been studied separately is wasting space. The result in so small a book as this is that the truth and applicability of a great number of formulae are taken for granted, which may account for the poor compliment paid to them by the author on p. 123, where he remarks:—

"A number of formulas will be given in the following paragraphs, but machinery cannot be designed by formulas alone. The author has frequently found that empirical, and other, formulas would sometimes come within 500 per cent. of the correct result."

There are also the inevitable slips of a "first edition," but they are not numerous. The author should, however, make a point in the next edition of correcting his description (on p. 33) of carbon monoxide as an unstable compound; his omission on p. 39,

in the discussion of the apparent suppression of heat on explosion, of any reference to the increase of specific heats admitted on p. 25; the error in saying (on p. 44) that it is usual to increase the compression pressure in an engine which is to run on kerosene, and he should also correct the general confusion of the table on p. 167. It is difficult to understand what the author means in his description (on p. 52) of the working of the gas producer by the remark:—"The limit of the ratio of steam to coal by weight is about 1 to 40."

Although, as has been stated, the author has attempted to get too much into so small a volume, it must be acknowledged that he has produced a book at once interesting in treatment and clear in language.

La materia radiante e i raggi magnetici. By Prof. A. Righi. Pp. vii+308. (Bologna: N. Zanichelli, 1909.) Price 8 lire.

In a recent number of NATURE a brief account was given of Righi's "magnetic rays," this being the name applied to a peculiar luminosity near the cathode of a vacuum tube, when the latter is placed in a longitudinal magnetic field. Righi supposes that this luminous column is due to electrically neutral doublets, which are not in sufficiently stable equilibrium to be looked upon as atoms or molecules, which owe, in fact, such stability as they possess to the action of the magnetic field. Several papers on this subject have been published by the author, and the main object of the present small volume is to give a connected account of the whole research. About one-third of the book is devoted to an extremely lucid and interesting summary of our present knowledge concerning the corpuscular theory of matter, written in a style which, as far as possible, is free from technical terms. The remainder, except for three short mathematical appendices, deals with the evidence for and against the existence of neutral doublets or magnetic rays. Here, while very suggestive, the experiments are not altogether convincing—this is evidently the opinion of Prof. Righi himself—but this is due in great measure to the difficult experimental conditions. While no one experiment can be said to have demonstrated the existence of magnetic rays, the results as a whole certainly tend to support the author's view. One point might have been treated more fully, viz., the conditions under which a magnetic field lowers the potential difference at the terminals of the discharge tube. Experiments are described, in some of which an increase, in others a decrease, of potential is brought about by the magnetic field, but it is not clear to what difference in the conditions this is due.

R. S. W.

Brassolidae. By Dr. H. Stichel. (Das Tierreich, 25 Lieferung.) Pp. xiv+244. (Berlin: R. Friedländer und Sohn, 1909.) Price 15 marks.

THIS is a very elaborate monograph of a comparatively small group of butterflies found only in Tropical America. They form a subfamily of the great family Nymphalidae, and are most nearly allied to the great blue Morphidae, but differ from them by their stouter bodies, darker colours, and the closed cell of the hind wings, which are generally ornamented with three large eye-spots on the under-surface. Their flight is crepuscular, while that of the Morphidae (which are represented in the East Indies as well as in Tropical America), is diurnal.

In 1823, Latreille and Godart, in the second part of "Papillons" in the "Encyclopédie méthodique," were acquainted with only twenty-three species now referred to the Brassolidae. Of these, twenty-one formed the bulk of the second section of the genus *Morpho*, while the remaining two species were